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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,641	04/21/2004	James C. Withers	MER 03.01	5332

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EXAMINER	
ROE, JESSEE RANDALL	
ART UNIT	PAPER NUMBER
1742	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/828,641	WITHERS ET AL.	
	Examiner	Art Unit	
	Jessee Roe	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *See Continuation Sheet* is/are pending in the application.

4a) Of the above claim(s) *16, 26, 28-29, 32-45, 47-53, 81-84, 86 and 106-109* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 11-12, 54-55, 58-61, 64-66, 76-77, 85 and 89-95* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims Status

Claims 1, 11-12, 54-55, 58-61, 64-66, 76-77, 85 and 89-95 are under examination, wherein claims 1, 59 and 66 are amended, claims 16, 26, 28-29, 32-45, 47-53, 81-84, 86 and 106-109 are withdrawn from consideration, claims 2-10, 13-15, 17-25, 27, 30-31, 46, 56-57, 62-63, 67-75, 78-80, 87-88, and 96-105 are canceled.

Status of Previous Rejections

The previous rejections of claims 1, 60, 64-65 and 93-95 under 35 U.S.C. 102(b) as being anticipated by Slatin (US 2,994,650) is withdrawn in view of the Applicant's amendments to the claims. The previous rejection of claim 54 under 35 U.S.C. 102(b) as being anticipated by Feige (US 3,915,837) is withdrawn in view of the Applicant's arguments. The previous rejection of claims 11-12, 61 and 76-77 under 35 U.S.C. 103(a) as being unpatentable over Slatin (US 2,994,650) in view of Westfall (US 5,215,631) is withdrawn in view of the Applicant's amendments to the claims. The previous rejection of claim 55 under 35 U.S.C. 103(a) as being unpatentable over Feige (US 3,915,837) in view of Westfall (US 5,215,631) is withdrawn in view of the Applicant's arguments. The previous rejection of claims 58-59 under 35 U.S.C. 103(a) as being unpatentable over Feige (US 3,915,837) in view of Slatin (US 2,994,650) is withdrawn in view of the Applicant's amendments to the claims. The previous rejection of claim 85 under 35 U.S.C..103(a) as being unpatentable over Slatin (US 2,994,650) in view of Rand (US 2,939,823) is withdrawn in view of the Applicant's arguments. The

previous rejection of claims 89-92 under 35 U.S.C. 103(a) as being unpatentable over Slatin (US 2,994,650) in view of Dean (US 2,904,428) is withdrawn in view of the Applicant's arguments.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 11, 54, 60, 66, 76, 85, 89-92 and 93-95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dean et al. (US 2,909,473) in view of Cass (US 4,931,213).

In regards to claims 1, 54, 60, 66 and 92, Dean et al. ('473) disclose a method for the production of titanium metal sealed from the inclusion of air comprising a molten salt electrolyte (sodium chloride) formed from a rutile (titanium oxide) anode (Example I). Dean et al. ('473) disclose melting the rutile (titanium oxide) in a graphite crucible without a barrier layer between the rutile (titanium oxide) and the graphite (carbon) which would inherently allow absorption of carbon into the rutile (Example I).

Dean et al. ('473) disclose a method for the production of titanium metal as shown above, but Dean et al. ('473) do not specify the formation of titanium suboxide.

Cass ('213) discloses that heating titanium oxide in a non-oxidizing atmosphere

in the presence of graphite (carbon) would result in the production of titanium suboxide, thereby forming an electrically conductive article (col. 2, lines 35-51 and col. 9, lines 7-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that contacting rutile (titanium oxide) with carbon at an elevated temperature in a non-oxidizing atmosphere, as disclosed by Dean et al. ('473) would result in the formation of titanium suboxide, as disclosed by Cass ('213), because Cass ('213) teaches a substantially similar process (titanium oxide contacting carbon in a non-oxidizing atmosphere at an elevated temperature) effecting the formation of titanium suboxide and an electrically conductive article (col. 2, lines 35-51 and col. 9, lines 7-42).

In regards to claims 11 and 76, Dean et al. ('473) further disclose adding hydrochloric acid (which is a strong Lewis acid) in order to obtain titanium with high purity (Example I).

In regards to claims 85, 89-91 and 93-95, Dean et al. ('473) disclose a method for producing titanium metal comprising a molten salt electrolyte (sodium chloride) and a rutile (titanium oxide) anode (Example I). Dean et al. ('473) disclose melting the rutile (titanium oxide) in a graphite crucible in the absence of air which would allow absorption of carbon into the rutile (Examples I and IV). Dean et al. ('473) disclose adding soluble titanium chloride in an amount equal to 3% titanium. The average valance of the titanium in the chloride would be 2.5 (Ti^{+2} and Ti^{+3} inherently both present). The application of an applied voltage deposits particulate titanium (metal) at the cathode

(one step) and the titanium metal would be removed by the addition of hydrochloric acid (strong Lewis acid) (Example I).

Claims 12, 55, 61, and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dean et al. (US 2,909,473) in view of Cass (US 4,931,213), and further in view of Rand (US 2,939,823).

In regards to claims 12, 55, 61 and 77, Dean et al. ('473) in view of Cass ('213) disclose a method for the production of titanium metal comprising a molten salt electrolyte as shown above, but Dean et al. ('473) in view of Cass ('213) do not specify wherein the molten salt electrolyte would include a eutectic mixture of alkali earth metal chlorides and/or fluorides.

Rand ('823) discloses, in the same field of endeavor, using a molten salt electrolyte of sodium chloride, potassium chloride, and lithium chloride in order to obtain baths with lower melting points (col. 3, lines 44-74).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method for the production of titanium metal, as disclosed by Dean et al. ('473) by using a molten salt electrolyte of sodium chloride, potassium chloride, and lithium chloride, as disclosed by Rand ('823), in order to obtain baths with lower melting points, as disclosed by Rand ('823) (col. 3, lines 44-74).

Claims 54-55, 58-61 and 64-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Slatin (US 2,994,650) in view of Kroll (The Production of Ductile Titanium) and further in view of Cass (US 4,931,213)

In regards to claims 54-55, 58-61 and 64-65, Slatin ('650) discloses a method for recovering titanium metal comprising purifying titanium from two moles of titanium oxide (titanium ore) and eight moles of bone charcoal (carbon) (1:4 ratio) in a molten salt electrolyte comprising lithium chloride, sodium chloride and potassium chloride (col. 1, lines 47-50 and Example IV) at a temperature of about 1200°C wherein the formation of carbon monoxide and titanium carbide would be inherently be formed (Examples I and IV), but Slatin ('650) do not specify the type of atmosphere that the method would be conducted in.

Kroll teaches that reduction of titanium would best be conducted in the absence of nitrogen and oxygen because nitrogen and oxygen cause the titanium to cold brittle (pg. 35).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method for recovering titanium metal, as disclosed by Slatin ('650), by performing the method in an atmosphere absent of nitrogen and oxygen (inert), as disclosed by Kroll, in order to prevent cold brittle of the titanium, as disclosed by Kroll (pg. 35).

Still regarding claims 54-55 and 60-61, Slatin ('650) in view of Kroll disclose a method for the production of titanium metal comprising a molten salt electrolyte and titanium oxide, but Slatin ('650) in view of Kroll do not specify wherein titanium suboxide would be formed.

Cass ('213) discloses that when heating titanium oxide in a non-oxidizing atmosphere in the presence of graphite (carbon) would result in the production of

titanium suboxide (col. 2, lines 35-51 and col. 9, lines 7-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that contacting titanium oxide with carbon at an elevated temperature in a non-oxidizing atmosphere, as disclosed Slatin ('650) in view of Kroll would result in the formation of titanium suboxide, as disclosed by Cass ('213), because Cass ('213) teaches a substantially similar process (titanium oxide contacting carbon in a non-oxidizing atmosphere at an elevated temperature) effecting the formation of titanium suboxide and an electrically conductive article (col. 2, lines 35-51 and col. 9, lines 7-42).

Response to Arguments

Applicant's arguments with respect to claims 1, 11-12, 54-55, 58-61, 64-66, 76-77, 85, 89-91 and 93-95 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JR

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

Continuation of Disposition of Claims: Claims pending in the application are 1,11,12,16,26,28,29,32-45,47-55,58-61,64-66,76,77,81-86,89-95 and 106-109.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :16 October 2006 & 9 February 2007 .